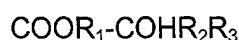


**WHAT IS CLAIMED IS:**

1. A method for the preparation of a composition for electroplating a copper-containing layer on a substrate, comprising the steps of:

- 5 (i) providing an aqueous solution comprising at least:
- a source of copper Cu (II) ions,
  - an additive to adjust the pH to a predetermined value, and
  - a complexing agent for complexing Cu (II) ions, said complexing agent having the chemical formula:

10



wherein R<sub>1</sub> is an organic group covalently bound to the carboxylate group (COO),  
R<sub>2</sub> is either hydrogen or an organic group, and

- 15 R<sub>3</sub> is either hydrogen or an organic group,  
said solution comprising no reducing agent,  
(ii) providing electrons from a source not being in direct contact with said solution, through transport means providing contact between said source and said solution.

2. A method according to claim 1, wherein the source supplying  
20 electrons is placed in said solution.

3. A method according to claim 2, wherein the source supplying electrons is a current generator or a battery.

4. A method according to claim 3, wherein the transport means comprise electrodes bound to wires.

- 25 5. A method according to claim 2, wherein the source supplying electrons has a current density comprised between 0.32 mA/cm<sup>2</sup> to 3.82 mA/cm<sup>2</sup>.

6. A method according to claim 1, wherein R<sub>2</sub> is hydrogen and R<sub>3</sub> is an organic group.

7. A method according to claim 1, wherein R<sub>2</sub> is hydrogen and R<sub>3</sub>  
30 is -CHOH-COOR<sub>1</sub>.

8. A method according to claim 1, wherein R<sub>1</sub> is a hydrocarbon group.

9. A method according to claim 1, wherein said complexing agent is selected from the group consisting of L-diethyltartrate, L-diisopropyltartrate, L-  
35 dimethyltartrate, L-dibutyltartrate, L-diethylactate, D-diethyltartrate, D-

diisopropyltartrate, D-dimethyltartrate, D-dibutyltartrate, D-diethylactate and a mixture of any of the foregoing.

10. A method according to claim 1, wherein the source of copper Cu(II) ions in the solution is  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

5 11. A method according to claim 1, wherein the additive to adjust the pH of the composition is  $[\text{Me}_4\text{N}]\text{OH}$  (TMAH).

12. A method according to claim 1, wherein the pH of said composition is comprised between 11 and 13.5, more preferably between 12 and 13.5, more preferably between 12.3 and 13.3.

10 13. A Process for forming at least one copper-containing layer on a substrate comprising at least the step of electroplating a copper-containing layer onto said substrate in a first electroplating bath, wherein said electroplating bath is the composition prepared by the method according to any one of the preceding claims.

15 14. A process according to claim 13, wherein the temperature of the composition is comprised between  $10^\circ\text{C}$  and  $50^\circ\text{C}$ , preferably between room temperature and  $45^\circ\text{C}$ .

15. A process according to claim 13, wherein said copper-containing layer is formed directly on said substrate.

20 16. A process according to claim 13, wherein said copper-containing layer is formed indirectly on said substrate after a pre-step of forming a primary layer on said substrate, so that said copper-containing layer is formed on said primary layer.

17. A process according to claim 16, wherein said primary layer is a copper diffusion barrier layer.

25 18. A process according to claim 17, wherein said copper diffusion barrier layer is metal conductive or not.

19. A process according to claim 18, wherein said copper diffusion barrier layer is selected from the group consisting of a Ti layer, a TiN layer, a Ta layer, a  $\text{WN}_x$  layer, a TaN layer, a Co layer and a Co-alloy layer.

30 20. A process according to claim 13, wherein the resulting copper-containing layer is a copper seed layer.

21. A process according to claim 20, further comprising the step of forming another copper-containing layer on the last formed copper seed layer using a second electroplating bath.

22. A process according to claim 21, wherein the second electroplating bath is the first electroplating bath used for forming the copper seed layer.

23. A process according to claim 21, wherein the second  
5 electroplating bath is a cupric-sulfuric acid-based electroplating bath.